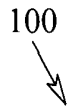

Sample MDX Query Statement

```
Select NON EMPTY {[Customers].[All Customers]} On Columns, NON EMPTY {[Education Level].[All
Education Level], [Education Level].[All Education Level].[Bachelors Degree], [Education Level].[All
Education Level].[Graduate Degree], [Education Level].[All Education Level].[High School Degree],
[Education Level].[All Education Level].[Partial College], [Education Level].[All Education Level].[Partial
High School]} On Rows From [Sales]
```

Sample Report Script Query Statement

```
{TABDELIMIT} {DECIMAL 10} <QUOTEMBRNAMES {OUTMBRNAMES} {MISSINGTEXT "0"}
<ROW("Periods") <COLUMN("Chart of Accounts") <DUPLICATE "Chart of Accounts"
<DUPLICATE "p Begin Bal" <DUPLICATE "p Qtr1" <DUPLICATE "p Qtr2" <DUPLICATE "p
Qtr3" <DUPLICATE "p Qtr4" <DUPLICATE "p Qtr1YTD" <DUPLICATE "p Qtr2YTD"
<DUPLICATE "p Qtr3YTD" <DUPLICATE "p Qtr4YTD" <DUPLICATE "Periods" !
```

FIG. 1
(BACKGROUND ART)

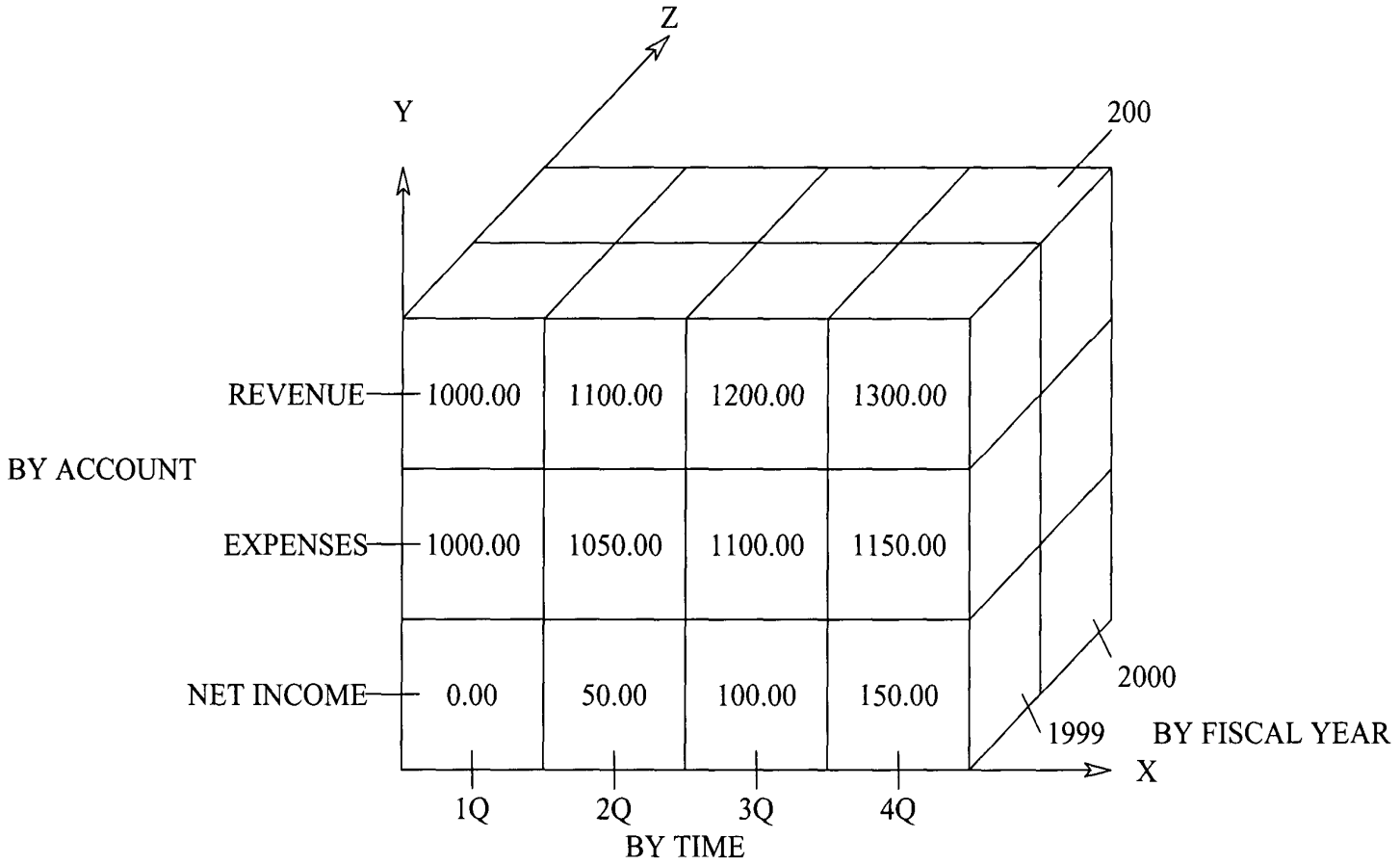
Z
Y
200
REVENUE
1000.00
1100.00
1200.00
1300.00
BY ACCOUNT
EXPENSES
1000.00
1050.00
1100.00
1150.00
NET INCOME
0.00
50.00
100.00
150.00
2000
1999
BY FISCAL YEAR
X
1Q
2Q
3Q
4Q
BY TIME

FIG. 2

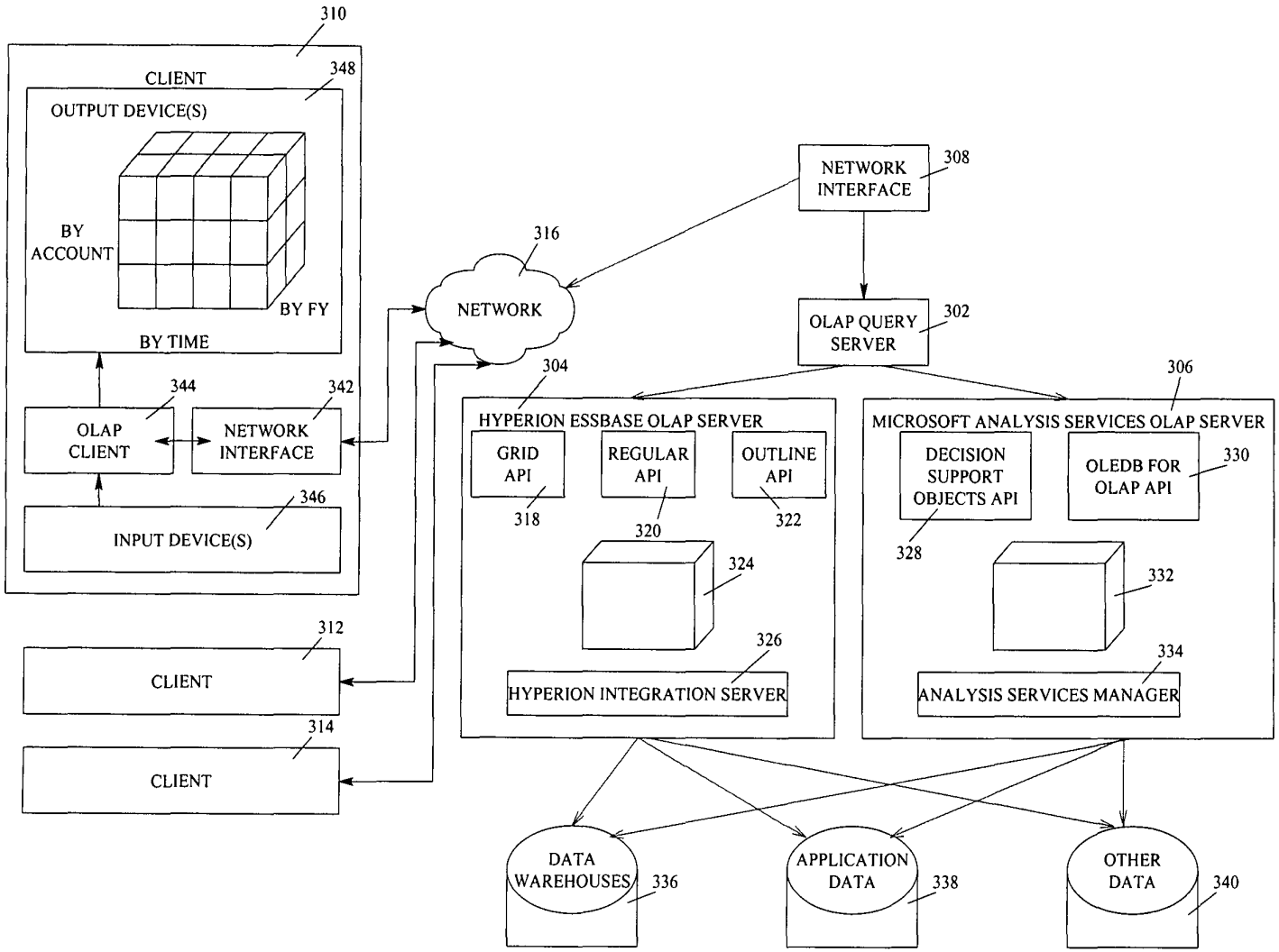
310
CLIENT
348
OUTPUT DEVICE(S)
BY ACCOUNT
BY FY
BY TIME
344
OLAP CLIENT
342
NETWORK INTERFACE
346
INPUT DEVICE(S)
316
NETWORK
308
NETWORK INTERFACE
302
OLAP QUERY SERVER
304
HYPERION ESSBASE OLAP SERVER
GRID API
318
REGULAR API
320
OUTLINE API
322
324
326
HYPERION INTEGRATION SERVER
306
MICROSOFT ANALYSIS SERVICES OLAP SERVER
DECISION SUPPORT OBJECTS API
328
OLEDB FOR OLAP API
330
332
334
ANALYSIS SERVICES MANAGER
312
CLIENT
314
CLIENT
DATA WAREHOUSES
336
APPLICATION DATA
338
OTHER DATA
340

FIG. 3

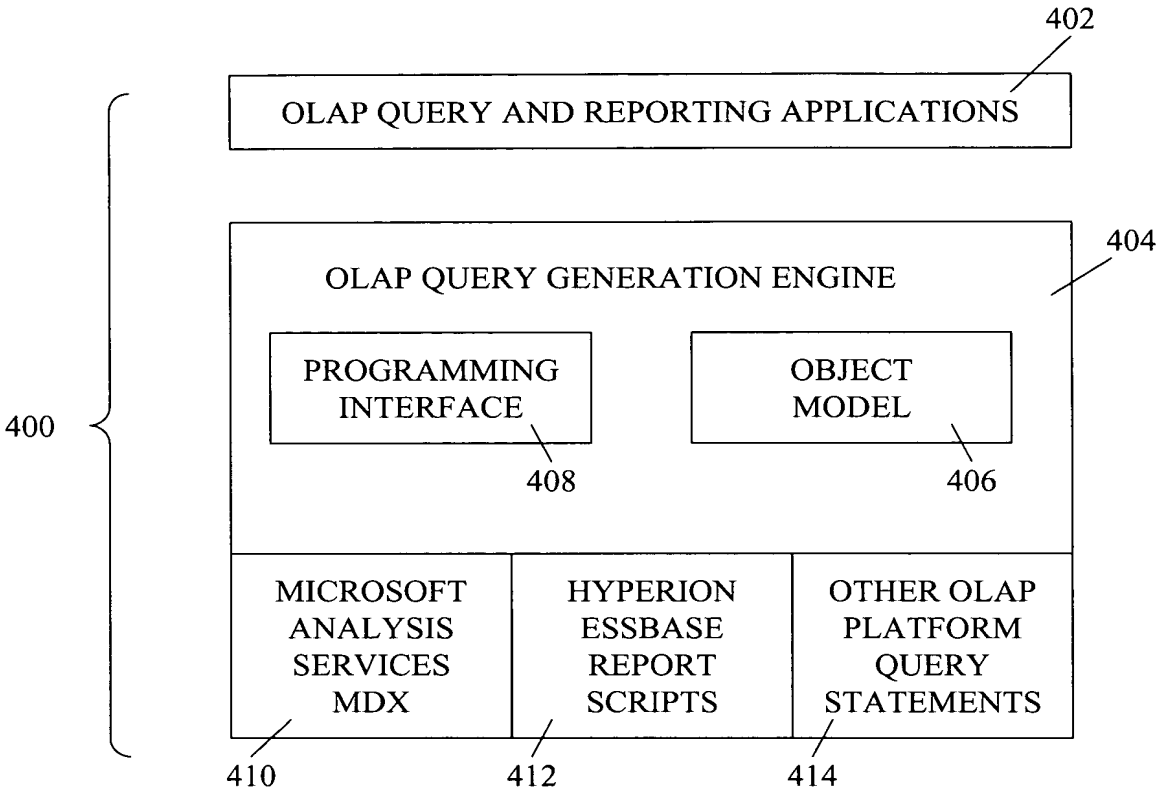
402
OLAP QUERY AND REPORTING APPLICATIONS
404
OLAP QUERY GENERATION ENGINE
PROGRAMMING INTERFACE
OBJECT MODEL
408
406
400
MICROSOFT ANALYSIS SERVICES MDX
HYPERION ESSBASE REPORT SCRIPTS
OTHER OLAP PLATFORM QUERY STATEMENTS
410
412
414

FIG. 4

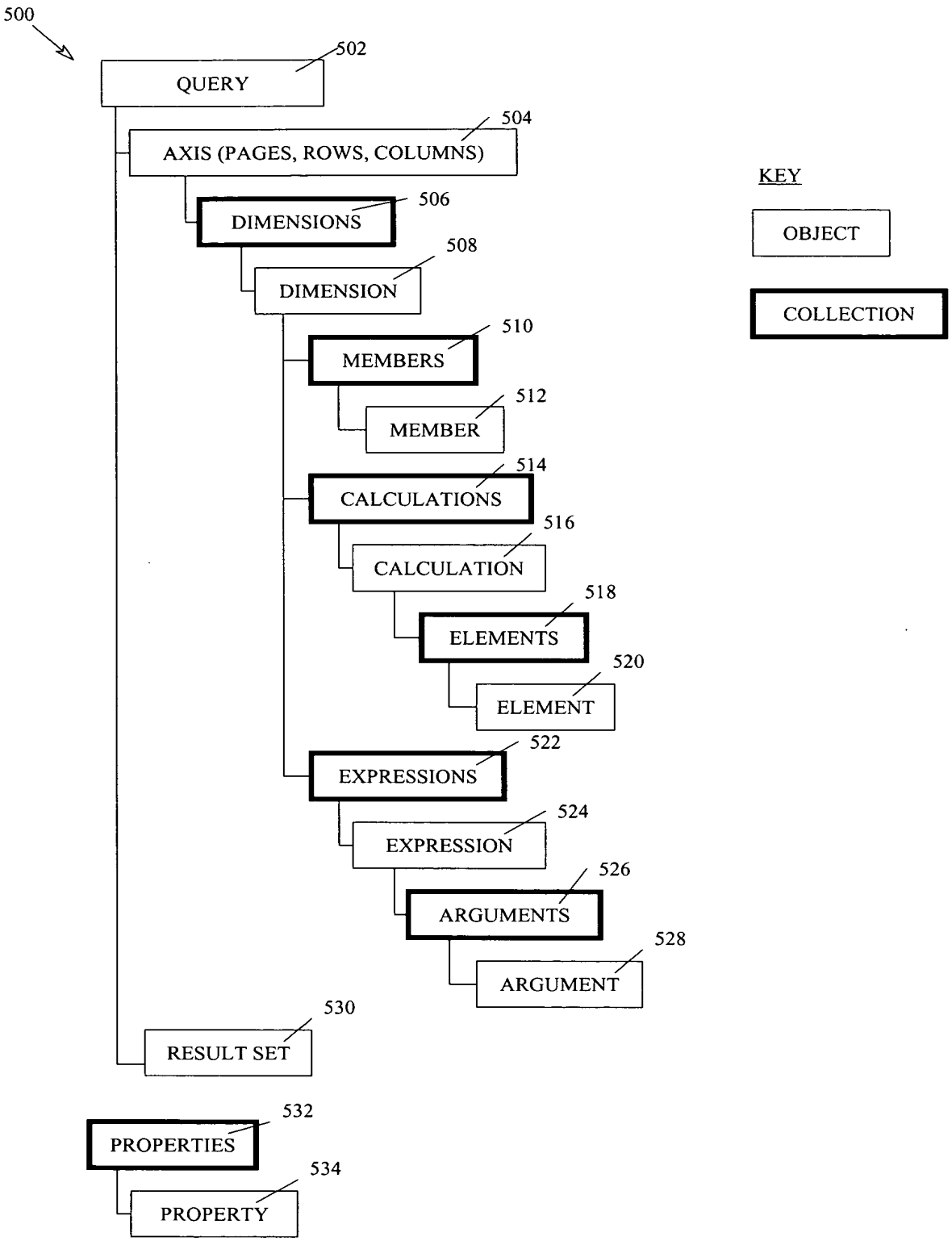
500
QUERY
502
AXIS (PAGES, ROWS, COLUMNS)
504
DIMENSIONS
506
DIMENSION
508
MEMBERS
510
MEMBER
512
CALCULATIONS
514
CALCULATION
516
ELEMENTS
518
ELEMENT
520
EXPRESSIONS
522
EXPRESSION
524
ARGUMENTS
526
ARGUMENT
528
RESULT SET
530
PROPERTIES
532
PROPERTY
534
KEY
OBJECT
COLLECTION

FIG. 5

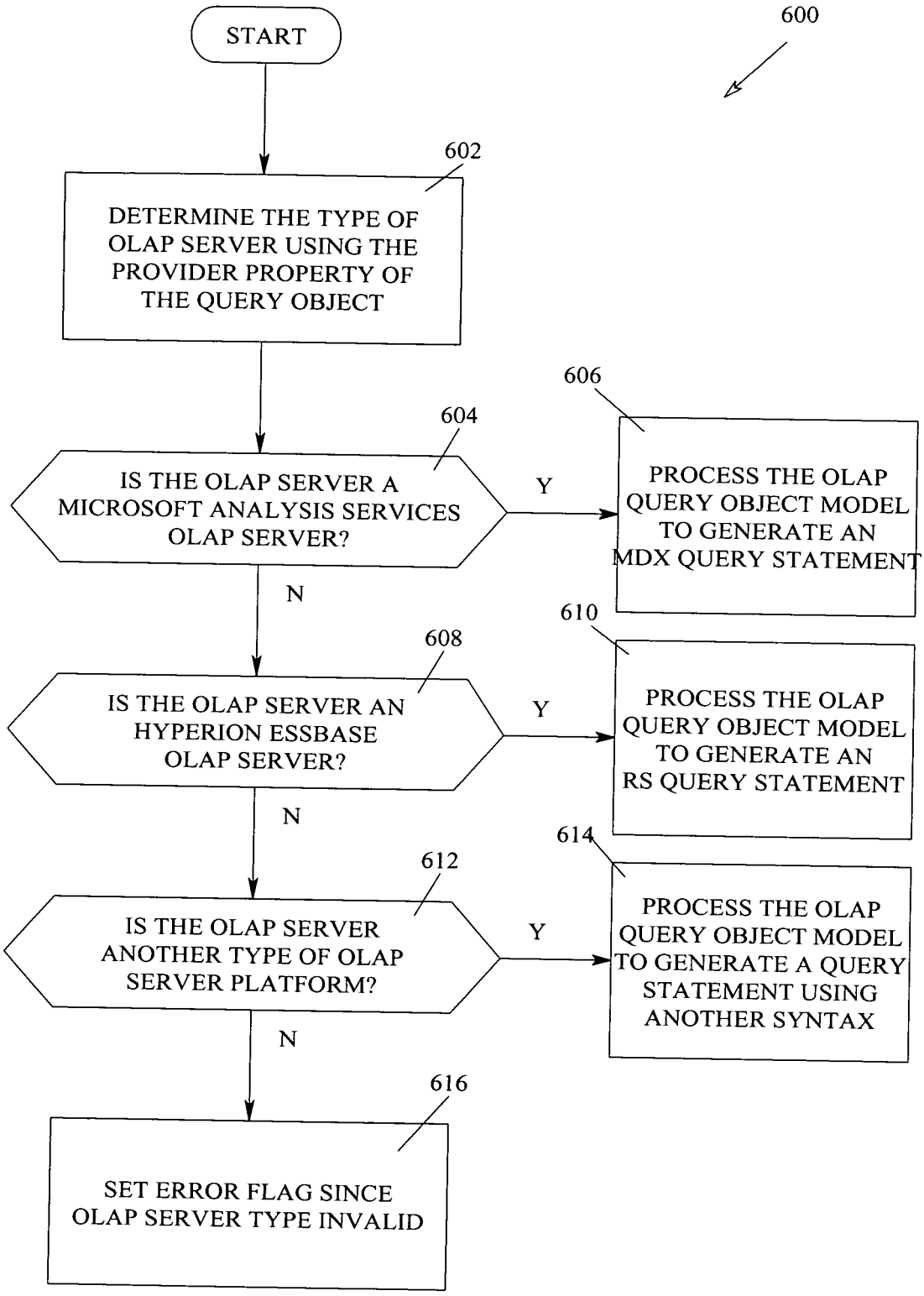
600
START
602
DETERMINE THE TYPE OF OLAP SERVER USING THE PROVIDER PROPERTY OF THE QUERY OBJECT
604
IS THE OLAP SERVER A MICROSOFT ANALYSIS SERVICES OLAP SERVER?
Y
606
PROCESS THE OLAP QUERY OBJECT MODEL TO GENERATE AN MDX QUERY STATEMENT
N
608
IS THE OLAP SERVER AN HYPERION ESSBASE OLAP SERVER?
Y
610
PROCESS THE OLAP QUERY OBJECT MODEL TO GENERATE AN RS QUERY STATEMENT
N
612
IS THE OLAP SERVER ANOTHER TYPE OF OLAP SERVER PLATFORM?
Y
614
PROCESS THE OLAP QUERY OBJECT MODEL TO GENERATE A QUERY STATEMENT USING ANOTHER SYNTAX
N
616
SET ERROR FLAG SINCE OLAP SERVER TYPE INVALID

FIG. 6

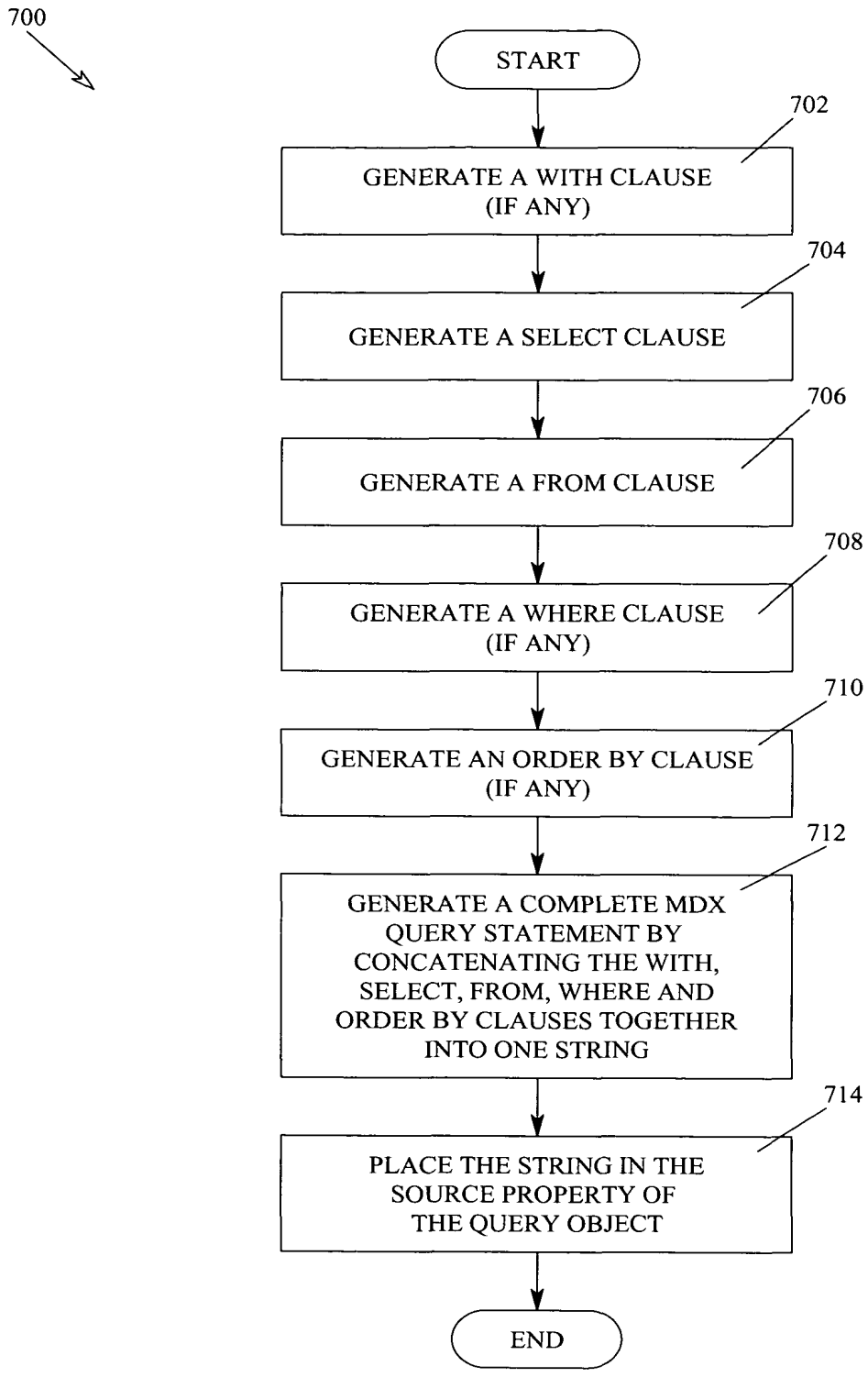
700
START
702
GENERATE A WITH CLAUSE (IF ANY)
704
GENERATE A SELECT CLAUSE
706
GENERATE A FROM CLAUSE
708
GENERATE A WHERE CLAUSE (IF ANY)
710
GENERATE AN ORDER BY CLAUSE (IF ANY)
712
GENERATE A COMPLETE MDX QUERY STATEMENT BY CONCATENATING THE WITH, SELECT, FROM, WHERE AND ORDER BY CLAUSES TOGETHER INTO ONE STRING
714
PLACE THE STRING IN THE SOURCE PROPERTY OF THE QUERY OBJECT
END

FIG. 7

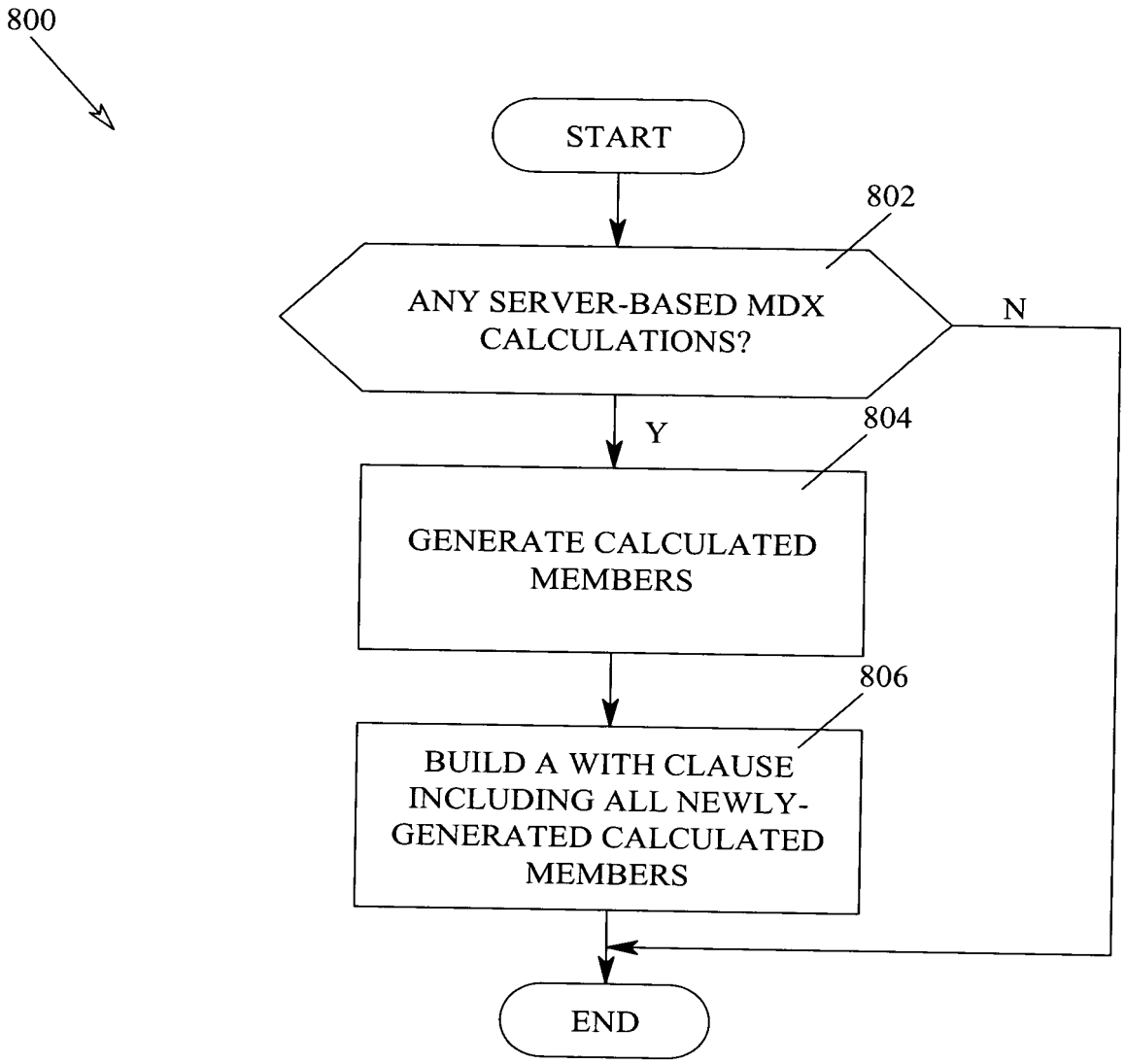
800
START
802
ANY SERVER-BASED MDX CALCULATIONS?
N
Y
804
GENERATE CALCULATED MEMBERS
806
BUILD A WITH CLAUSE INCLUDING ALL NEWLY-GENERATED CALCULATED MEMBERS
END

FIG. 8

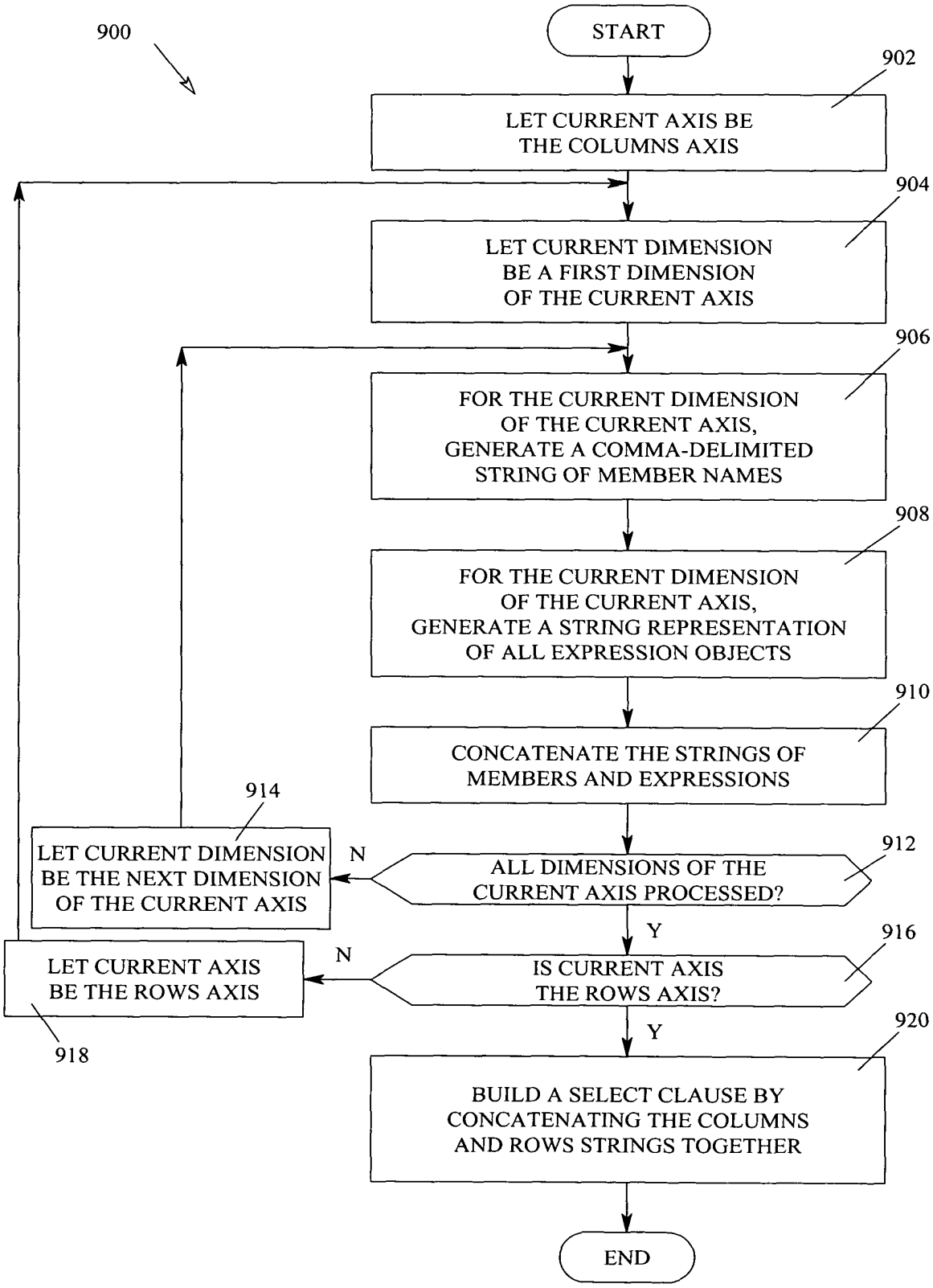
900
START
902
LET CURRENT AXIS BE THE COLUMNS AXIS
904
LET CURRENT DIMENSION BE A FIRST DIMENSION OF THE CURRENT AXIS
906
FOR THE CURRENT DIMENSION OF THE CURRENT AXIS, GENERATE A COMMA-DELIMITED STRING OF MEMBER NAMES
908
FOR THE CURRENT DIMENSION OF THE CURRENT AXIS, GENERATE A STRING REPRESENTATION OF ALL EXPRESSION OBJECTS
910
CONCATENATE THE STRINGS OF MEMBERS AND EXPRESSIONS
912
ALL DIMENSIONS OF THE CURRENT AXIS PROCESSED?
N
914
LET CURRENT DIMENSION BE THE NEXT DIMENSION OF THE CURRENT AXIS
Y
916
IS CURRENT AXIS THE ROWS AXIS?
N
LET CURRENT AXIS BE THE ROWS AXIS
918
Y
920
BUILD A SELECT CLAUSE BY CONCATENATING THE COLUMNS AND ROWS STRINGS TOGETHER
END

FIG. 9

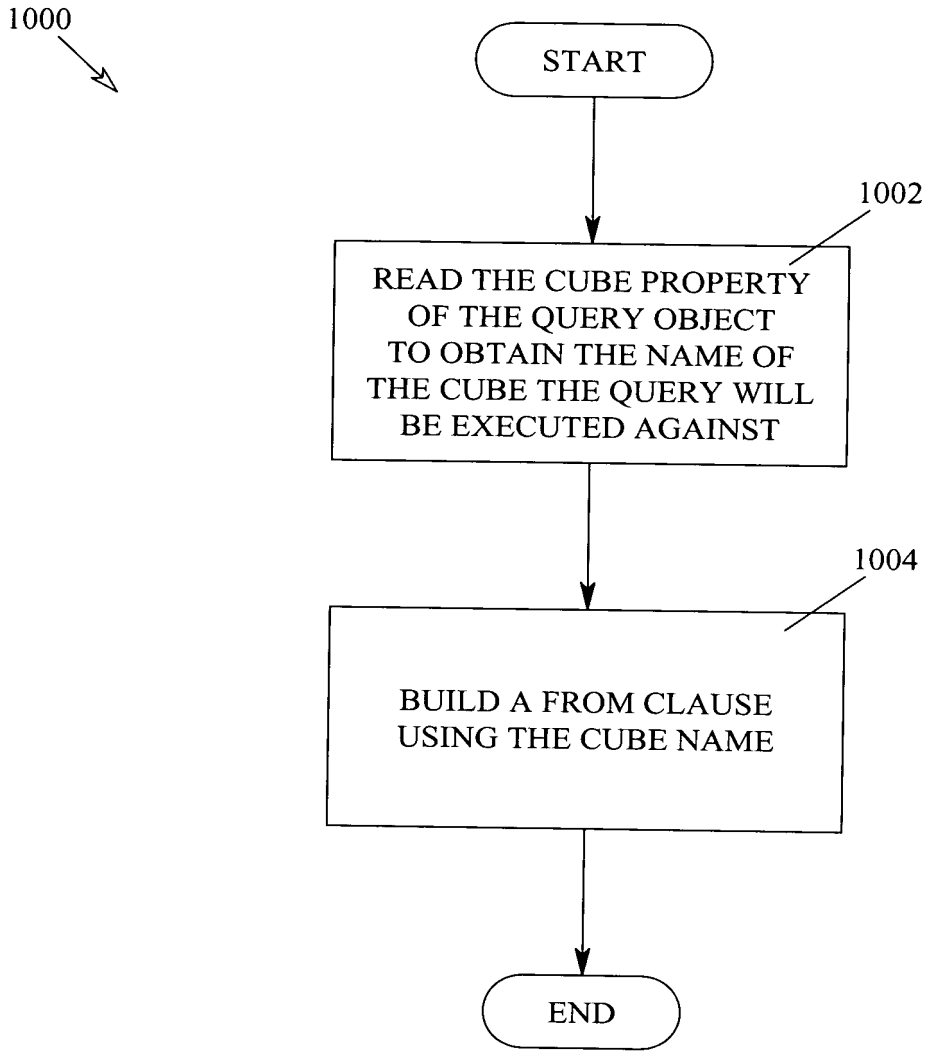
1000
START
1002
READ THE CUBE PROPERTY OF THE QUERY OBJECT TO OBTAIN THE NAME OF THE CUBE THE QUERY WILL BE EXECUTED AGAINST
1004
BUILD A FROM CLAUSE USING THE CUBE NAME
END

FIG. 10

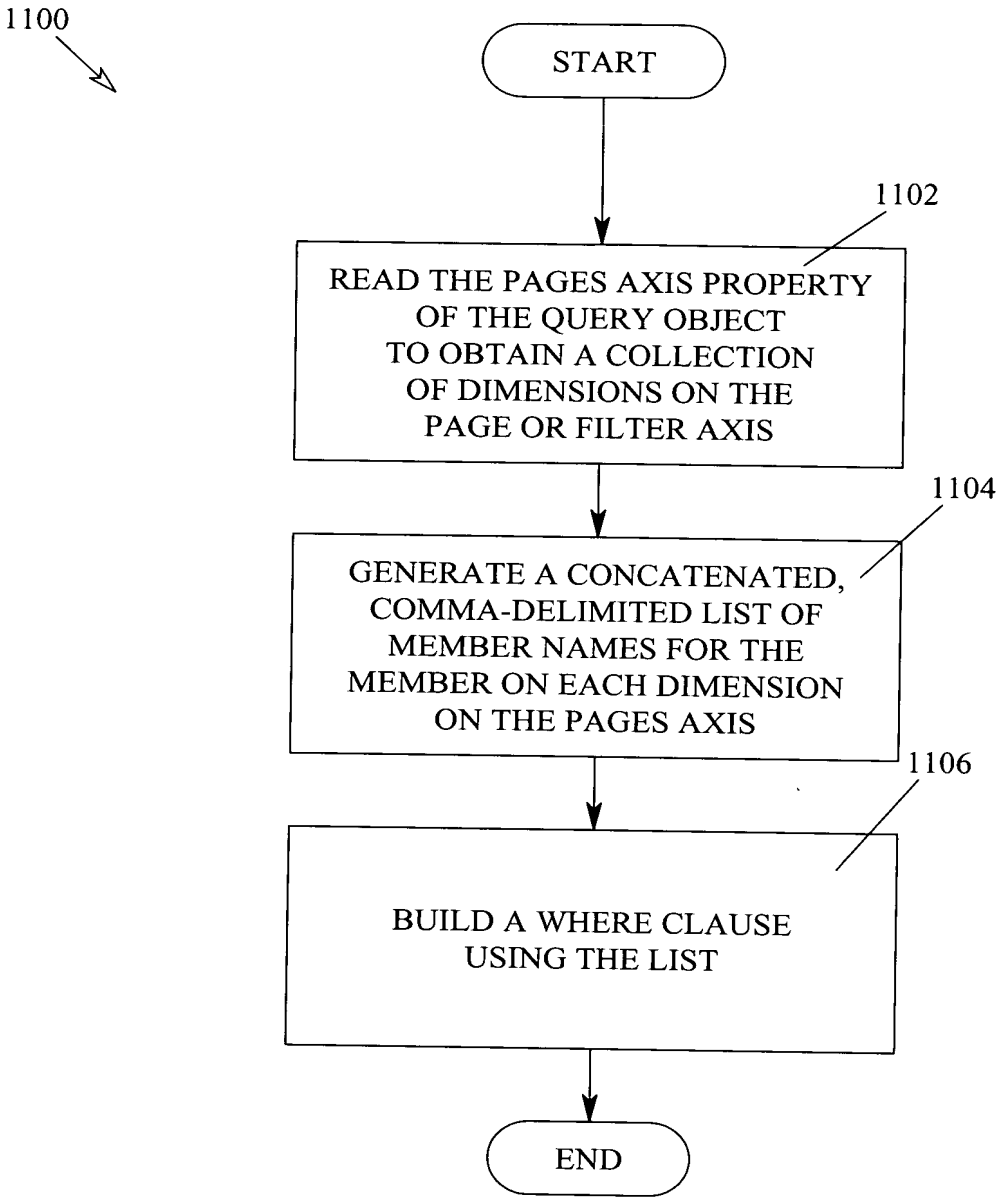
1100
START
1102
READ THE PAGES AXIS PROPERTY OF THE QUERY OBJECT TO OBTAIN A COLLECTION OF DIMENSIONS ON THE PAGE OR FILTER AXIS
1104
GENERATE A CONCATENATED, COMMA-DELIMITED LIST OF MEMBER NAMES FOR THE MEMBER ON EACH DIMENSION ON THE PAGES AXIS
1106
BUILD A WHERE CLAUSE USING THE LIST
END

FIG. 11

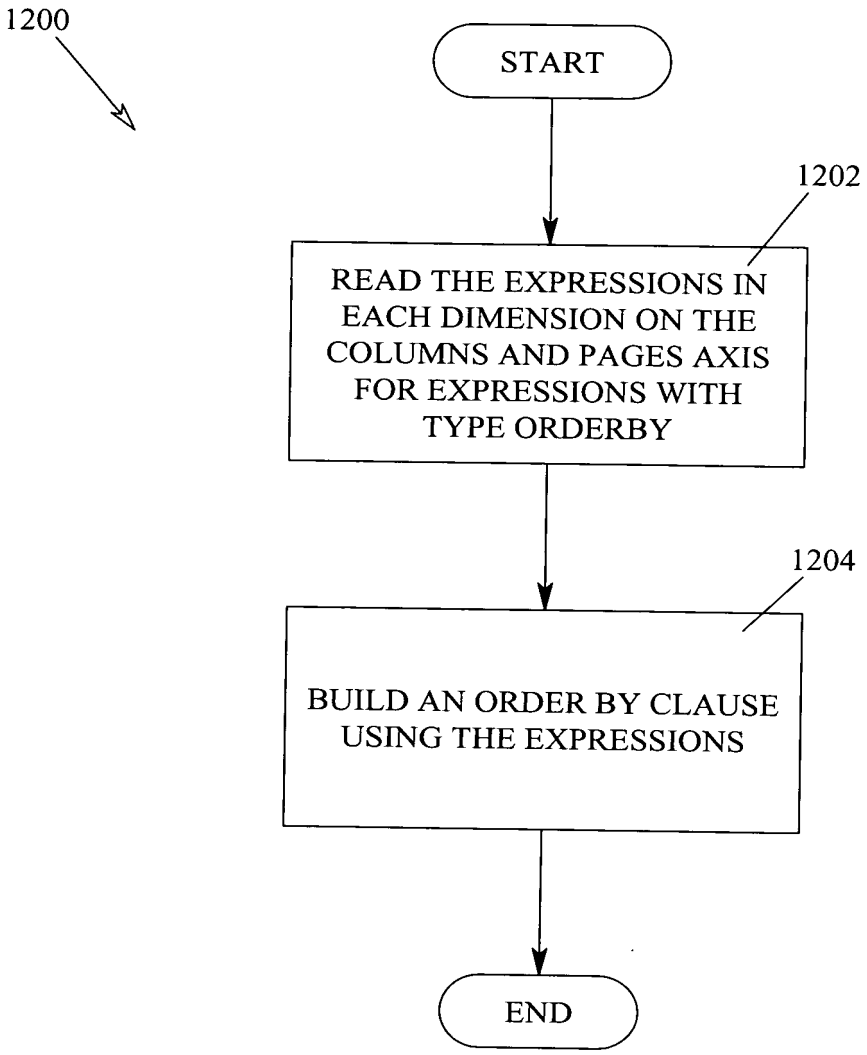
1200
START
1202
READ THE EXPRESSIONS IN EACH DIMENSION ON THE COLUMNS AND PAGES AXIS FOR EXPRESSIONS WITH TYPE ORDERBY
1204
BUILD AN ORDER BY CLAUSE USING THE EXPRESSIONS
END

FIG. 12

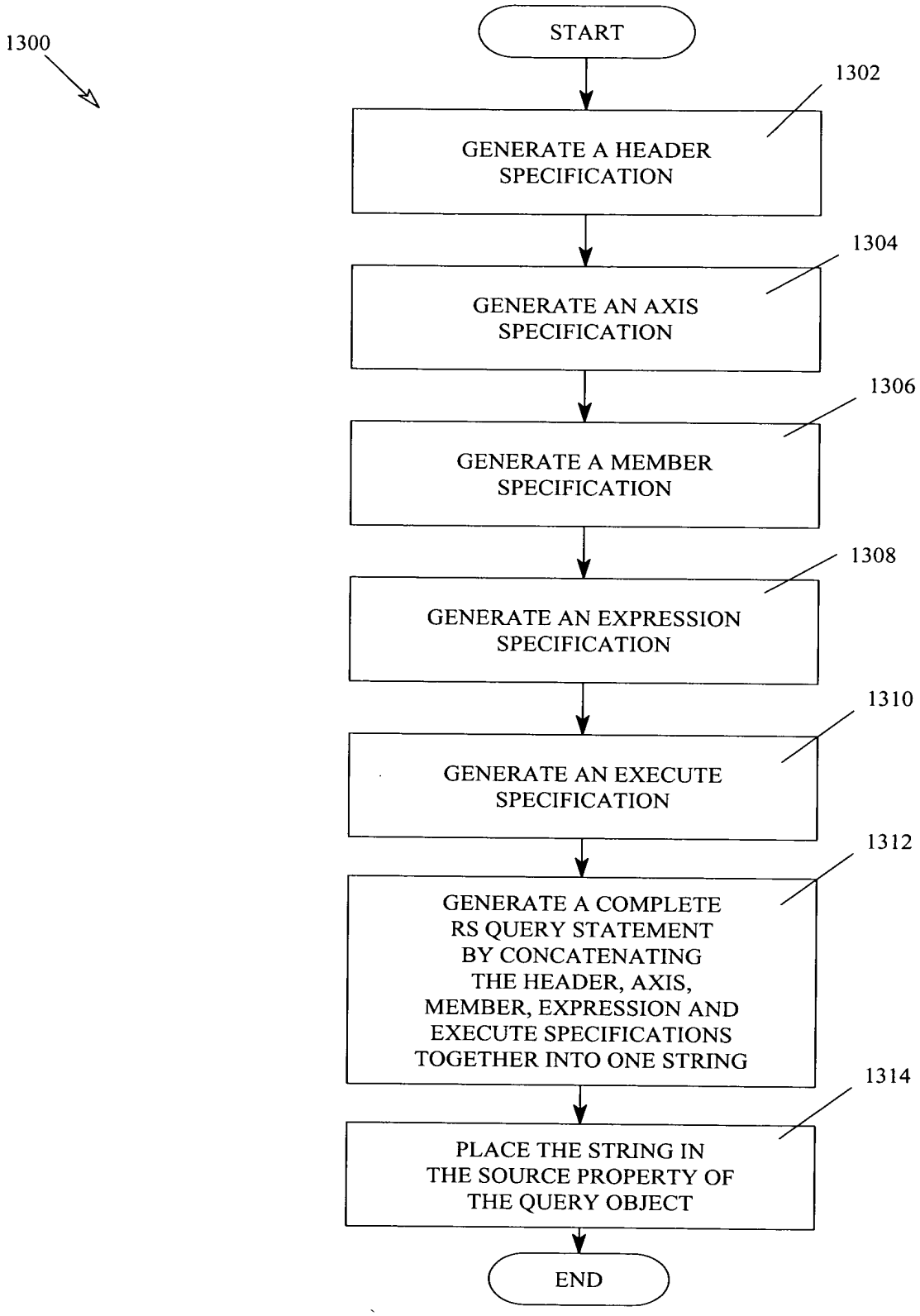
1300
START
1302
GENERATE A HEADER SPECIFICATION
1304
GENERATE AN AXIS SPECIFICATION
1306
GENERATE A MEMBER SPECIFICATION
1308
GENERATE AN EXPRESSION SPECIFICATION
1310
GENERATE AN EXECUTE SPECIFICATION
1312
GENERATE A COMPLETE RS QUERY STATEMENT BY CONCATENATING THE HEADER, AXIS, MEMBER, EXPRESSION AND EXECUTE SPECIFICATIONS TOGETHER INTO ONE STRING
1314
PLACE THE STRING IN THE SOURCE PROPERTY OF THE QUERY OBJECT
END

FIG. 13

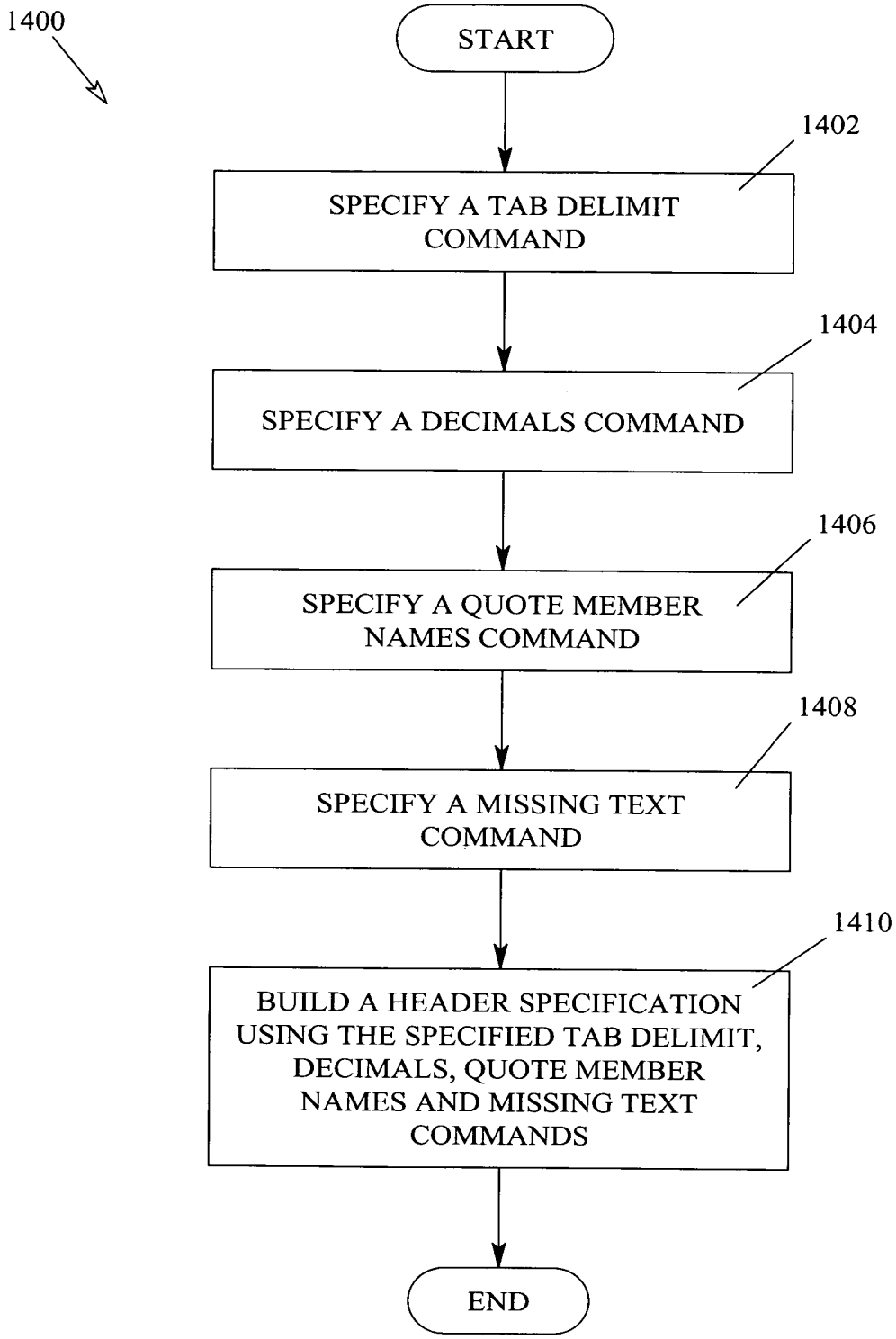
1400
START
1402
SPECIFY A TAB DELIMIT COMMAND
1404
SPECIFY A DECIMALS COMMAND
1406
SPECIFY A QUOTE MEMBER NAMES COMMAND
1408
SPECIFY A MISSING TEXT COMMAND
1410
BUILD A HEADER SPECIFICATION USING THE SPECIFIED TAB DELIMIT, DECIMALS, QUOTE MEMBER NAMES AND MISSING TEXT COMMANDS
END

FIG. 14

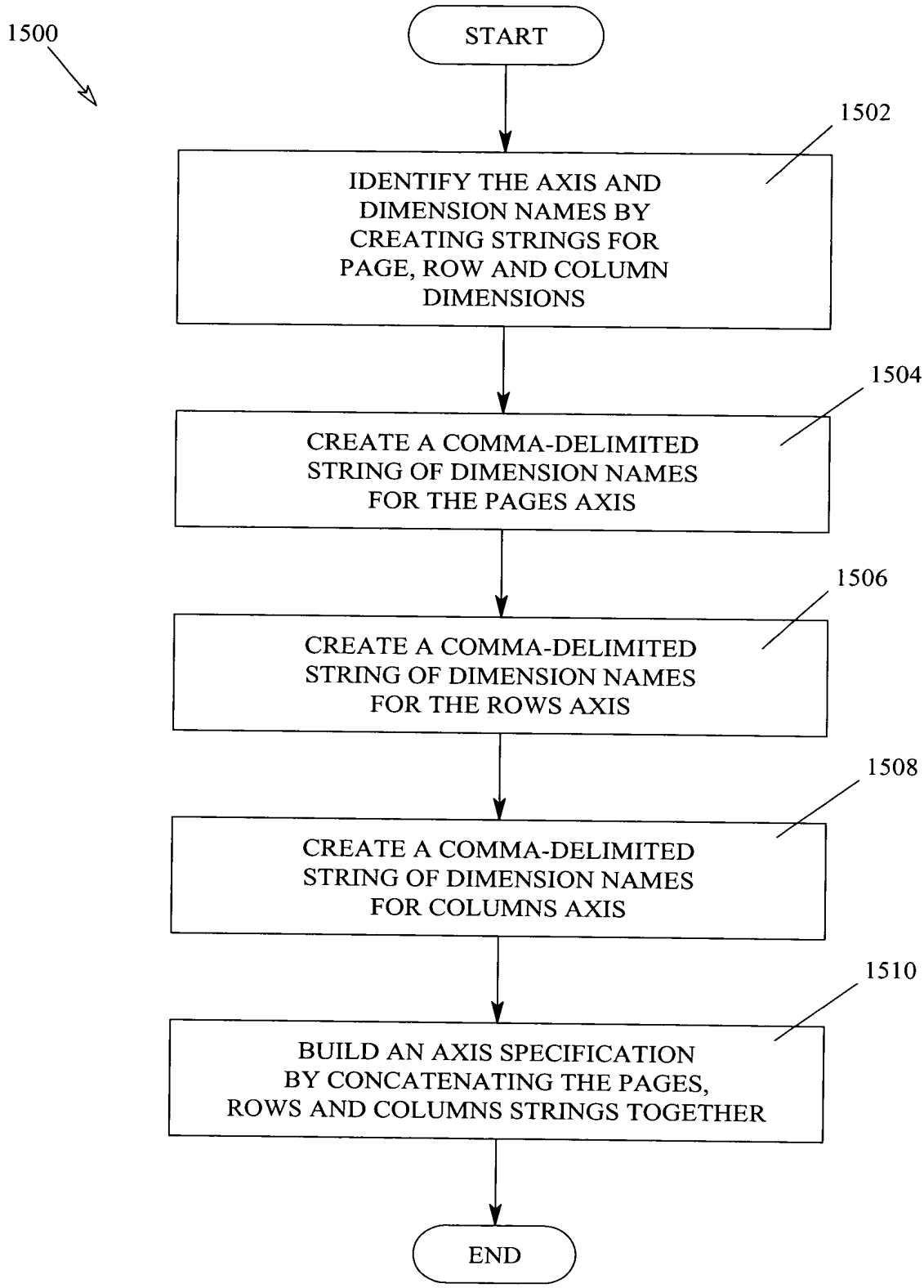
1500
START
1502
IDENTIFY THE AXIS AND DIMENSION NAMES BY CREATING STRINGS FOR PAGE, ROW AND COLUMN DIMENSIONS
1504
CREATE A COMMA-DELIMITED STRING OF DIMENSION NAMES FOR THE PAGES AXIS
1506
CREATE A COMMA-DELIMITED STRING OF DIMENSION NAMES FOR THE ROWS AXIS
1508
CREATE A COMMA-DELIMITED STRING OF DIMENSION NAMES FOR COLUMNS AXIS
1510
BUILD AN AXIS SPECIFICATION BY CONCATENATING THE PAGES, ROWS AND COLUMNS STRINGS TOGETHER
END

FIG. 15

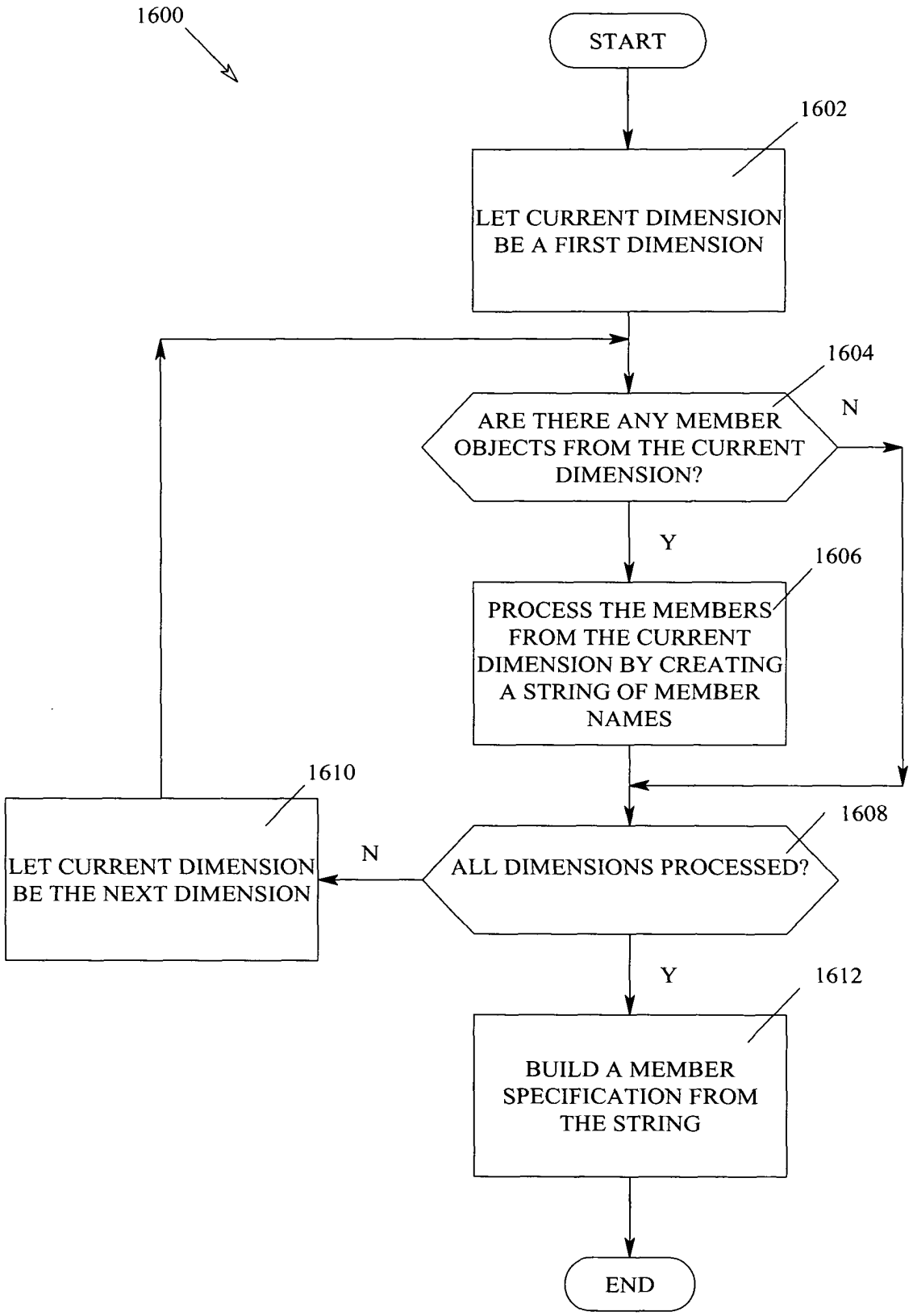
1600
START
1602
LET CURRENT DIMENSION BE A FIRST DIMENSION
1604
ARE THERE ANY MEMBER OBJECTS FROM THE CURRENT DIMENSION?
N
Y
1606
PROCESS THE MEMBERS FROM THE CURRENT DIMENSION BY CREATING A STRING OF MEMBER NAMES
1608
ALL DIMENSIONS PROCESSED?
N
1610
LET CURRENT DIMENSION BE THE NEXT DIMENSION
Y
1612
BUILD A MEMBER SPECIFICATION FROM THE STRING
END

FIG. 16

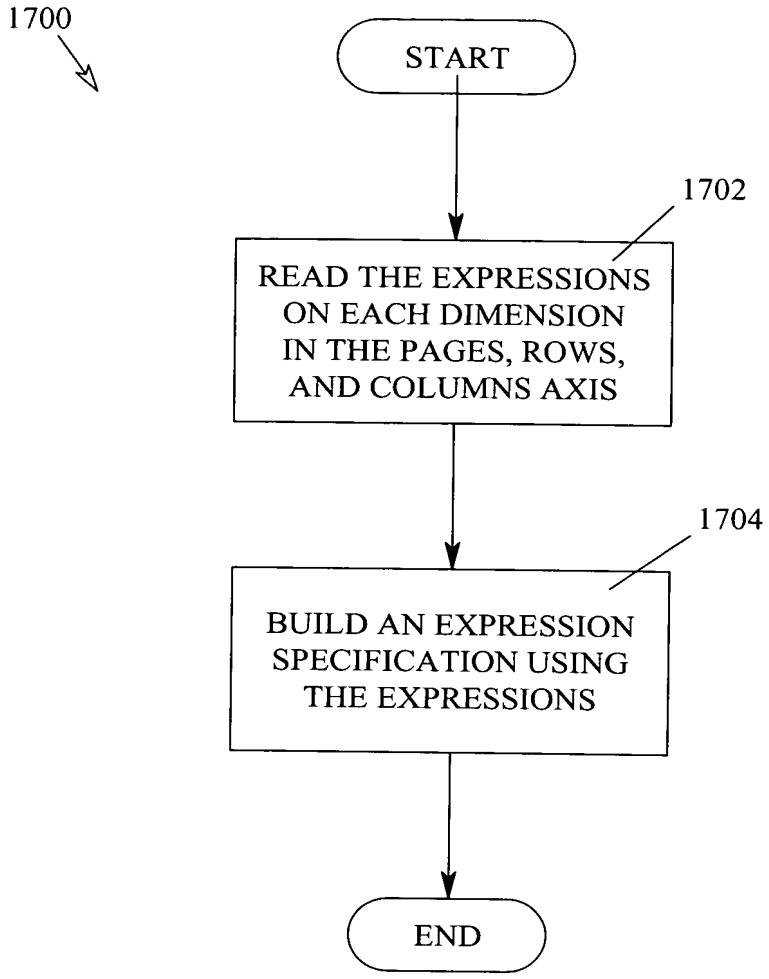
1700
START
1702
READ THE EXPRESSIONS ON EACH DIMENSION IN THE PAGES, ROWS, AND COLUMNS AXIS
1704
BUILD AN EXPRESSION SPECIFICATION USING THE EXPRESSIONS
END

FIG. 17

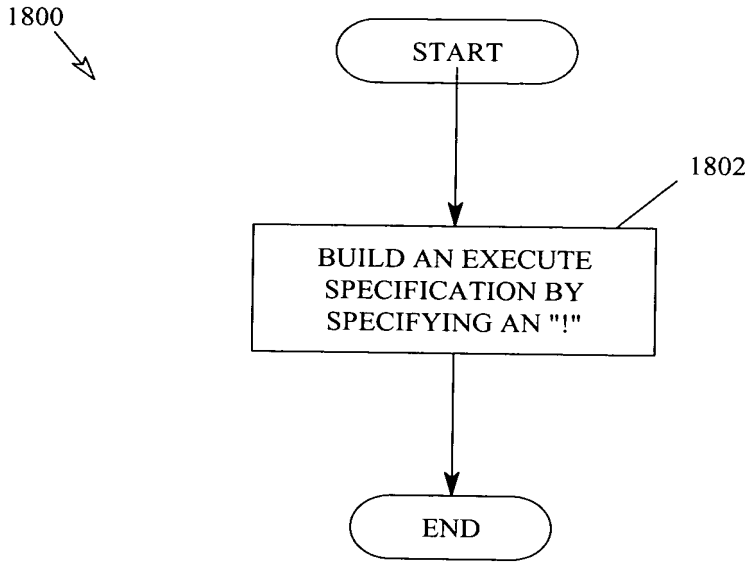
1800
START
1802
BUILD AN EXECUTE SPECIFICATION BY SPECIFYING AN "!"
END

FIG. 18

1900

FUNCTION	DESCRIPTION
DRILL	DRILL UP OR DOWN ON A MEMBER
PIVOT	MOVE A DIMENSION FROM ONE AXIS TO ANOTHER
KEEP ONLY	KEEP ONLY THE SELECTED MEMBER(S) FOR THE DIMENSION
REMOVE ONLY	REMOVE ONLY THE SELECTED MEMBER(S) FOR THE DIMENSION

FIG. 19

2000

FUNCTION	PROCESS
DRILL	SET THE *RELATIONSHIP* (CHILDREN, PARENT, ETC.) PROPERTY ON THE SELECTED MEMBER TO A DRILL OPTION, AND THEN RE-CREATE THE QUERY STATEMENT. FOR SPECIAL DRILL OPTIONS (LIKE DRILL TO ANCESTORS, OR DESCENDANTS), AN EXPRESSION OBJECT MAY BE MORE USEFUL AS IT ALLOWS THE INCLUSION OF ADDITIONAL ARGUMENTS TO SUPPORT THE DRILLING OPERATION.
PIVOT	REMOVE THE SELECTED DIMENSION FROM ITS CURRENT AXIS AND ADD IT TO THE TARGET AXIS. NOTE, THE USER MAY ALSO OPTIONALLY SPECIFY AN ORDINAL AT WHICH TO ADD THE DIMENSION. THIS DRIVES THE ORDER OF ALL DIMENSIONS ON THE AXIS. NOTE, THE "FROM" AND "TO" AXIS MAY BE THE SAME IF THE USER IS SIMPLY RE-ORDERING THE DIMENSIONS ON THE AXIS. RE-CREATE THE QUERY STATEMENT.
KEEP ONLY	REMOVE ALL MEMBERS EXCEPT THE SELECTED MEMBER(S) FROM THE AFFECTED DIMENSION. THEN, RE-CREATE THE QUERY STATEMENT.
REMOVE ONLY	REMOVE ONLY THE MEMBER(S) SPECIFIED FROM THE AFFECTED DIMENSION. THEN RE-CREATE THE QUERY STATEMENT.

FIG. 20

2100

AXIS COLLECTION	DIMENSION	MEMBER
ROWS	ACCOUNTS	REVENUE
		EXPENSES
		NET INCOME
	TIME	QUARTER 1
		QUARTER 2
		QUARTER 3
		QUARTER 4
COLUMNS	FISCAL YEARS	1999
		2000

FIG. 21

2200

		1999	2000
REVENUE	**QUARTER 1**	1000.00	1400.00
	QUARTER 2	1100.00	1500.00
	QUARTER 3	1200.00	1600.00
	QUARTER 4	1300.00	1700.00
EXPENSES	**QUARTER 1**	1000.00	1200.00
	QUARTER 2	1050.00	1250.00
	QUARTER 3	1100.00	1300.00
	QUARTER 4	1150.00	1350.00
NET INCOME	**QUARTER 1**	0.00	200.00
	QUARTER 2	50.00	250.00
	QUARTER 3	100.00	300.00
	QUARTER 4	150.00	350.00

FIG. 22

2300

AXIS COLLECTION	DIMENSION	MEMBER
ROWS	TIME	QUARTER 1
		QUARTER 2
		QUARTER 3
		QUARTER 4
	ACCOUNTS	REVENUE
		EXPENSES
		NET INCOME
COLUMNS	FISCAL YEARS	1999
		2000

FIG. 23

2400

		1999	2000
QUARTER 1	**REVENUE**	1000.00	1400.00
	EXPENSES	1000.00	1200.00
	NET INCOME	0.00	200.00
QUARTER 2	**REVENUE**	1100.00	1500.00
	EXPENSES	1050.00	1250.00
	NET INCOME	50.00	250.00
QUARTER 3	**REVENUE**	1200.00	1600.00
	EXPENSES	1100.00	1300.00
	NET INCOME	100.00	300.00
QUARTER 4	**REVENUE**	1300.00	1700.00
	EXPENSES	1150.00	1350.00
	NET INCOME	150.00	350.00

FIG. 24

2500

AXIS COLLECTION	DIMENSION	MEMBER
ROWS	TIME	QUARTER 1
		QUARTER 2
		QUARTER 3
		QUARTER 4
COLUMNS	FISCAL YEARS	1999
		2000
	ACCOUNTS	REVENUE
		EXPENSES
		NET INCOME

FIG. 25

2600

		1999			2000	
	REVENUE	EXPENSES	NET INCOME	REVENUE	EXPENSES	NET INCOME
QUARTER 1	1000.00	1000.00	0.00	1400.00	1200.00	200.00
QUARTER 2	1100.00	1050.00	50.00	1500.00	1250.00	250.00
QUARTER 3	1200.00	1100.00	100.00	1600.00	1300.00	300.00
QUARTER 4	1300.00	1150.00	150.00	1700.00	1350.00	350.00

FIG. 26

2700

		1999			2000	
	REVENUE	EXPENSES	NET INCOME	**REVENUE**	EXPENSES	NET INCOME
QUARTER 1	**1000.00**	1000.00	0.00	**1400.00**	1200.00	200.00
QUARTER 2	**1100.00**	1050.00	50.00	**1500.00**	1250.00	250.00
QUARTER 3	**1200.00**	1100.00	100.00	**1600.00**	1300.00	300.00
QUARTER 4	**1300.00**	1150.00	150.00	**1700.00**	1350.00	350.00

FIG. 27